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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,245	01/16/2002	Cathie J. Burke	106452	4390

25944 7590 11/24/2003

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EXAMINER	
CHACKO DAVIS, DABORAH	
ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 11/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/046,245	BURKE ET AL.	
	Examiner	Art Unit	
	Daborah Chacko-Davis	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) *10,11,25 and 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 12-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, Claims 1-9, and 12-24 in Paper No. 5 is acknowledged. The traversal is on the ground(s) that a thorough search for the subject matter of any one of Group of claims would encompass a search for the subject matter of the remaining claims. This is not found persuasive because device can be formed by another and materially different process such as ion beam etching.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9, 12, 14, and 16-24, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,368,754 (Imai) in view of U. S. Patent No. 5,344,748 (Feely).

Imai, in col 2, lines 60-67, in col 3, lines 1-19, and lines 50-52, and lines 38-65, in col 5, lines 21-27, in col 6, lines 7-67, and in figures 9B, and 10B, discloses a method of patterning the resist on a wafer comprising using a patterned mask (reticle) that includes a plurality of transparent regions (first mask on the reticle, reference 3a), a plurality of partially transmissive regions (a second mask on the reticle, reference 6a)

and an opaque region, positioning the first mask of the reticle over a first area of the resist (resist composition of a photopolymer) coated substrate, and irradiating the resist to form a first pattern forming the greater sized contact hole, positioning the second mask (partially transmissive) of the same reticle is positioned at a second area of the resist coated substrate wherein the second area is irradiated with light through the second mask to form a second pattern forming the smaller sized contact hole, and developing the resist to transfer the first pattern and the second pattern (of topographical differences) to the resist (claims 1, 8, 12, 16, 18, and 23). Imai, in col 4, lines 36-44, in col 5, lines 8-30, and in figure 7, discloses first contact holes and second contact holes wherein the second contact holes are about one-half the size of the first contact holes (at least a variation of about 5:1) (claims 4, and 21). Imai, in col 6, line 13, discloses that the resist used to coat the substrate is a negative resist (claims 9, 17, and 24).

The difference between the claims and Imai is that Imai does not disclose that the first mask is fully transmissive and that the second mask is partially transmissive. Imai does not disclose that the mask is used to control the radiation transmitted onto the surface of the resist so that topographical differences between the first pattern and the second pattern (features) are from about 0.1 microns to about 5 microns (claims 2, 14, and 19). Imai does not disclose that the resist thickness is from about 5 microns to about 500 microns (claims 3, and 20). Imai does not disclose that the features (first and second) have a width of from about 2 microns to about 3cm (claims 5, and 22). Imai does not disclose that the transparent region has a transmittance of at least about 90%,

and the partially transmissive region of the mask has transmittance of about 50% to about 90% (claim 6). Imai does not disclose that the transparent region has a transmittance of about 100%, and the partially transmissive region has a transmittance of about 70% to about 80% (claim 7). Imai does not disclose that the resist patterning process can be used to make an ink jet print head.

Feely, in col 8, lines 60-68, discloses the use of substrates that are coated with a photosensitive coating having a thickness of from about 0.5 to about 50 microns. Feely, in col 10, lines 46-69, discloses that the photomask that partially transmissive regions of transmittance that varies from 1 to 32% and even more, and transmissive regions that range in their transmission from 1 to 100%. Feely, in col 10, lines 25-69, and in col 12, lines 1-22, and in figures 7, 8, and 9, discloses that the topographical variations of the features can be manipulated by controlling the exposure dosage of actinic radiation. Feely, in col 2, lines 7-11, discloses that the method of patterning resists can be used to make ink jet print heads.

Therefore, it would be obvious to a skilled artisan to modify Imai by employing the mask suggested by Feely because Feely, in col 10, lines 60-69, discloses that the radiation attenuation feature of a photomask is especially useful for manipulating the thickness of a structure having different thicknesses along its width and length, varying from the full thickness of the deposited photosensitive coating down to the very thin layer on the substrate and that such varied topography on a substrate can be prepared using the process and a single attenuating mask pattern. It would be obvious to a skilled artisan to modify Imai by employing the method of patterning resists to

manufacture ink jet print heads as taught by Feely, because Imai, in col 1, lines 7-8, and 10-11, discloses that method relates to manufacturing semiconductor devices and selectively designing LSI's.

3. Claims 13, and 15, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,368,754 (Imai) in view of U. S. Patent No. 5,344,748 (Feely) as applied to claims 1-9, 12, 14, and 16-24 above, and further in view of U. S. Patent No. 5,485,181 (Convers).

Imai in view of Feely is discussed in paragraph no. 2.

The difference between the claims and Imai in view of Feely is that Imai in view of Feely does not disclose the ink jet print head is a thermal ink jet print head including a substrate that is a heated wafer, and method including mounting a cover plate on the patterned resist on the substrate, wherein the first features and the second features provide ink flow channels in the thermal ink jet print head (claim 13). Feely does not disclose that the cover plate is mounted on the patterned resist without performing any post-patterning processing to a surface of the resist that is irradiated by the radiation source and faces the cover plate (claim 15).

Convers, in col 1, lines 48-64, discloses that the ink jet print head is of the thermal type and that the print head includes a bottom plate (substrate), wherein the bottom plate is heat generating and includes features that perform as ink passage ways, a photoresist layer (deposited or laminated or sprayed) on the bottom plate that is imaged and developed (thicknesses vary), a top plate (cover plate) positioned on the

patterned resist layer such that the top plate is not patterned (post photo-patterning).

Therefore, it would be obvious to modify Imai in view of Feely by employing the ink jet print suggested by Convers because Feely, in col 2, lines 7-11, discloses the use of patterned resist of different dimensions in an ink jet printer wherein the dimensions (patterned resist) perform as ink passageways and Convers, in col 1, lines 48-53, discloses that the claimed details of the print head design are well known in the art and will vary with the manufacturer.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (703) 306-5923. If the examiner is unavailable, you may contact her supervisor, Mark F. Huff at (703) 308-2464. FAX communications should be sent to the official Right FAX number (703) 872-9306 for all responses. FAXES received after 4:00 P.M. will not be processed until the following business day.

dcd

November 17, 2003.

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700